

I Claim:

1. A wireless network system comprising:

a communication hub linked to a source;

at least one remote station which communicates with said communication hub in order to exchange information with the source, each of said at least one remote station including a directive antenna; and

a multi-beam antenna connected to said communication hub to allow the exchange of information between said communication hub and each of said at least one remote station, said multi-beam antenna producing a plurality of beams for such exchange of information.

2. The wireless network system of claim 1, wherein there is a plurality of remote stations.

3. The wireless network system of claim 1, further including a beam former linked between said hub and said multi-beam antenna.

4. The wireless network system of claim 3, wherein said beam former includes the use of a NxN hybrid coupling matrix having N input ports and N radiating elements and wherein a value of N may be any radix 2 number

5. The wireless network system of claim 3, wherein said beam former includes fixed microwave frequency phase delays, microwave frequency couplers, and microwave radiators.

6. The wireless network system of claim 3, wherein said beam former is in the form of stripline etched patterns on at least one circuit board.

7. The wireless network system of claim 3, wherein said beam former is in the form of microstrip etched patterns on at least one circuit board.

8. The wireless network system of claim 1, further including a Ethernet switch as part of said hub which is linked between the source and said multi-beam antenna.

9. The wireless network system of claim 1, further including at least one radio transceiver as part of said hub which is linked between the source and said multi-beam antenna.

10. The wireless network system of claim 9, further including a switching matrix as part of said hub which is linked between one said at least one radio transceiver and said multi-beam antenna, said switching matrix allowing service of more than one of said at least one remote station by one radio transceiver.

11. The wireless network system of claim 9, further including a Ethernet switch as part of said hub which is linked between the source and said at least one radio transceiver.

12. The wireless network system of claim 1, further including a radio transceiver for each of said at least one remote station as part of said hub which is linked between the source and said multi-beam antenna.

13. The wireless network system of claim 12, further including a Ethernet switch as part of said hub which is linked between the source and each of said radio transceivers.

14. The wireless network system of claim 1, further including more than one multi-beam antenna and wherein each of said multi-beam antennas includes a primary service sector which forms an area of said plurality of beams of each of said multi-beam antennas.

15. The wireless network system of claim 1, further including a received signal strength indicator device at said hub to monitor received signal strength of said beams and adapt power of said beams produced by said multi-beam antenna.

16. The wireless network system of claim 1, further including a controller at said hub for frequency coordination, power control and data packet transmission.

17. The wireless network system of claim 1, further including a received signal strength indicator device at said at least one remote station to monitor received signal strength of said beams and adapt power of said beams produced by said multi-beam antenna.

18. The wireless network system of claim 1, further including a controller at said at least one remote station for frequency coordination, power control, and data packet transmission.

19. The wireless network system of claim 1, wherein said multi-beam antenna includes radiating elements on a circuit board.

20. The wireless network system of claim 19, wherein said multi-beam antenna is of a microstrip construction.

21. The wireless network system of claim 1, wherein the source is linked to said hub by said multi-beam antenna.

22. The wireless network system of claim 21, further including at least one radio transceiver as part of said hub which is linked between a signal received by said multi-beam antenna from the source and a port of said multi-beam antenna in which the signal is directed to so that the signal may be transmitted to one of said at least one remote station.

23. The wireless network system of claim 22, further including a switching matrix as part of said hub which is linked between one said at least one radio transceiver which receives said signal from the source and said multi-beam antenna, said switching matrix allowing the service of more than one of said at least one remote station by one radio transceiver.

24. The wireless network system of claim 1, wherein adjacent beams of said plurality of beams are of a different frequency.

25. The wireless network system of claim 1, wherein each of said at least one remote station is within a 3 dB beamwidth of one of said plurality of beams.

26. The wireless network system of claim 1, wherein at least two non-adjacent beams of said plurality of beams are of a same frequency.

27. The wireless network system of claim 26, wherein said at least two non-adjacent beams and said remote stations linked to said at least two non-adjacent beams include power adjustment such that sidelobes associated with communication of one of said non-adjacent beams is minimized so as to minimize interference with said other of said non-adjacent beams which are of the same frequency.

28. The wireless network system of claim 1, wherein each of at least two remote stations that utilize a same beam of said plurality of beams for communication have a different polarization of said directive antenna at each of said remote stations.

29. The wireless network system of claim 1, wherein said multi-beam antenna is a circuit board of radiating elements covered by a radome.

30. A wireless network system comprising:

a communication hub linked to a source;

at least one remote station which communicates with said communication hub in order to exchange information with the source, each of said at least one remote station including a directive antenna;

a multi-beam antenna connected to said communication hub to allow the exchange of information between said communication hub and each of said at least one remote station, said multi-beam antenna producing a plurality of beams for such exchange of information; and

a beam former linked between said hub and said multi-beam antenna.

31. The wireless network system of claim 30, further including a Ethernet switch as part of said hub and linked between the source and said beam former.

32. The wireless network system of claim 31, further including at least one radio transceiver as part of said hub and linked between said Ethernet switch and said beam former.

33. The wireless network system of claim 30, wherein there is a plurality of remote stations.

34. The wireless network system of claim 32, wherein there is a plurality of remote stations.

35. The wireless network system of claim 30, further including more than one multi-beam antenna and wherein each of said multi-beam antennas includes a primary service sector in which are said plurality of beams of each of said multi-beam antennas.

36. The wireless network system of claim 34, further including more than one multi-beam antenna and wherein each of said multi-beam antennas includes a primary service sector in which are said plurality of beams of each of said multi-beam antennas.

37. A wireless reflector system for communication about an obstruction comprising:

at least two sources blocked by the obstruction which are ends of a communication path; and

a multi-beam antenna have at least two beams generated by said multi-beam antenna, where one is a first beam and the other is a second beam, said multi-beam antenna positioned between said at least two sources, such that said first beam is linked to one of said at least two sources and said second beam is linked to the other of said at least two sources, and where said first and second beams are connected to provide said communication path between said at least two sources.

38. A wireless reflector system of claim 37, further including an amplification and signal processing device between said connected first and second beams to maintain signal integrity along said communication path between said at least two sources.

39. A method of a source communicating with a plurality of remote stations using a wireless network system, the wireless network system including a communication hub linked to the source; at least one remote station which communicates with said communication hub in order to exchange information with the source, each of said at least one remote station including a directive antenna; a multi-beam antenna connected to said communication hub to allow the exchange of information between said communication hub and each of said at least one remote

station, said multi-beam antenna producing a plurality of beams for such exchange of information; comprising:

linking each of said at least one remote station to one of said plurality of beams; and

coordinating sending and receiving of the information between the source and remote station by way of the plurality of beams using the hub.

40. The method of claim 39, further including a beam former linked between said hub and said multi-beam antenna.

41. The method of claim 40, further including a Ethernet switch as part of said hub and linked between the source and said beam former.

42. The method of claim 41, further including at least one radio transceiver as part of said hub and linked between said Ethernet switch and said beam former.

43. The method of claim 40, further including more than one multi-beam antenna and wherein each of said multi-beam antennas includes a primary service sector in which are said plurality of beams of each of said multi-beam antennas.

44. The method of claim 42, further including more than one multi-beam antenna and wherein each of said multi-beam antennas includes a primary service sector in which are said plurality of beams of each of said multi-beam antennas.

Patent to be issued